



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/991,781	11/26/2001	Henrik Stiesdal	PATRADE	5904

7590 06/03/2003
James C. Wray
Suite 300
1493 Chain Bridge Road
McLean, VA 22101

EXAMINER

VERDIER, CHRISTOPHER M

ART UNIT	PAPER NUMBER
----------	--------------

3745

DATE MAILED: 06/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/991,781

Applicant(s)

STIESDAL ET AL.

Examiner

Christopher Verdier

Art Unit

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 4-23-03 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Art Unit: 3745

Applicants' Amendment dated April 23, 2003 has been carefully considered but is deemed non-persuasive. New claims 14-20 are pending. The proposed drawing corrections have been approved by the examiner. The specification has been amended to correct the informality set forth in the first Office action. Correction of the above matters is noted with appreciation.

With regard to Dassen, Applicants have argued that the Office reading of improving efficiency is incorrect, because Dassen states that the wind turbine is intended to reduce noise. Applicants have argued that the instant application provides a device with optimal performance efficiency displayed in the power curve of the wind turbine, and that Dassen does not disclose any means for improving this performance. These arguments are not persuasive, because by virtue of the fact that Dassen reduces noise, Dassen concurrently increases efficiency. Reduction of noise reduces energy that otherwise would be expended in operation of the wind turbine blades in terms of losses. As set forth in the first Office action, the serrated trailing edges of Dassen improve the lift and drag, which are recognized by persons having ordinary skill in the art to improve efficiency. Assuming arguendo that Applicant is correct that the noise reduction in Dassen does not increase efficiency (which the examiner does not agree with), Dassen inherently increases efficiency because the serrated trailing edges are similar in nature to those disclosed by Applicants. The fact that Applicants have recognized inherent properties of Dassen does not render the claims patentable. Note that anticipation by a prior art reference does not require the recognition of inherent properties that may be possessed by the prior art reference. *Verdegaal Bros. Inc. v. Union Oil Co.*, 814 F.2d 628, 633, 2USPQ2d 1051, 1054 (Fed. Cir.),

Art Unit: 3745

cert. denied, 484 US 827 (1987). Concerning Applicants' argument that the examiner has stated that "the serrated trailing edges improve that life (sic) and drag" and that this is an allegation that not supported by any of the explanations given by the examiner, or in Dassen, the examiner disagrees. It is commonly known in the art of aerodynamics that flaps, rudders, and other similar discontinuities at the trailing edges of airfoils improve lift and drag.

With regard to Applicants' argument that nothing in Dassen indicates that the serrations are provided as a retrofit, and that Dassen relates to different fixing of the serrations, the examiner disagrees. As set forth in the first Office action, the serrations are provided as a retrofit of an existing wind turbine rotor by attachment of a serrated panel 7 (figure 2) to the surface of the wind turbine blade near the existing trailing edge (column 2, lines 2-3).

With regard to Applicants' argument that German Patent 311,416 does not disclose that the serrated trailing edges thereof increase lift and drag, and that there is nothing related to improvement in the efficiency by making use of the serrated trailing edge, the examiner disagrees. As set forth in the first Office action, one of ordinary skill in the art would readily recognize that the serrated trailing edges disclosed by the German Patent improve the lift and drag, which inherently improves the efficiency of the wind turbine. Similar to the reasons set forth above, because the serrated trailing edges thereof are similar in nature to those disclosed by Applicants, the German Patent serrated blades inherently increases efficiency. The fact that Applicants have recognized inherent properties of the German Patent 311,416 does not render

Art Unit: 3745

the claims patentable. Anticipation by a prior art reference does not require the recognition of inherent properties that may be possessed by the prior art reference.

Concerning Applicants' arguments that the combination of Dassen and Vijgen and the combination of Dassen and Crook do not teach or suggest the claimed invention, these arguments are not persuasive. Specifically, with regard to Applicants' argument that Vijgen does not mention the possibility of improving efficiency in the meaning of electrical power output from the windmill at a given speed, this argument is not persuasive because Vijgen is merely relied upon to teach sawteeth that have approximately 60 degrees included angles between adjacent vertices. In response to applicant's arguments against the Vijgen reference individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

With regard to Applicants' argument that the combination of Dassen and Crook is not relevant because Crook only relates to aerodynamic control and does not relate to improved efficiency, this argument is not persuasive because Crook is merely relied upon to teach that the angle of the serrations/panels changes passively in response to the speed and angle of the airflow at the trailing edge due to the flexing of the serrations and/or serrated panels. As set forth above, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references.

Drawings

The drawings are objected to because figures 10-11 contain numerous regions that are blurred and unreadable. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Examiner's Suggestions to Claim Language

The following are suggestions to improve the clarity and precision of the claims:

In claim 1, line 2, -- the -- may be inserted after "providing".

In claim 1, line 7, "an" may be changed to -- the --.

In claim 1, line 8, "an" may be changed to -- the --.

Claim Objections

Claims 14-16 and 19 are objected to because of the following informalities: Appropriate correction is required.

In claim 14, lines 17-19, "and extending the ... being the existing trailing edge" is duplicative and should be deleted.

In claim 15, line 1, -- step of -- should be inserted after "the".

In claim 16, line 1, -- step of -- should be inserted after "the".

In claim 19, line 1, -- are -- should be inserted after "serrations" (first occurrence).

Art Unit: 3745

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 14-15 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dassen in view of Crook. Dassen (figures 1-8) discloses a method and an apparatus for improving the efficiency of a wind turbine substantially as claimed, whereby rotor blades 3-5 are furnished with serrated trailing edges 6-11, 22-24 with plural span-wise, periodic indentations, with the serrations extending from the trailing edge into the airflow behind the trailing edge. The serrations are provided as a retrofit of an existing wind turbine rotor by attachment of a serrated panel 7 (figure 2) to the surface of the wind turbine blade near the existing trailing edge (column 2, lines 2-3). The serrations are provided over a spanwise extent of the trailing edge having a

Art Unit: 3745

length in the range of 30 to 100 percent of the radius of the blade (see figure 1). As shown in figures 2-3, for example, the serrations are provided at an angle different from 0 degrees relative to a chord of the blade. The serrated panel may be fixed to the rear edge of the blade (column 2, lines 1-4), which inherently includes a means for connecting the serrated panel 7 to the trailing edges of the blades. In claim 17, lines 4-5, "means for connecting the serrated panel to a trailing edge on each blade of the wind turbine rotor" invokes 35 USC 112, sixth paragraph. Applicant has not provided any explicit definition in the specification of the "means for connecting the serrated panel to the trailing edge of the blades", and the means disclosed by Dassen for connecting the serrated panel 7 to the trailing edges of the blades meets the claimed function. One of ordinary skill in the art would readily recognize that the serrated trailing edges disclosed by Dassen improve the lift and drag, which inherently improves the efficiency of the wind turbine. Dassen also inherently increases efficiency because the serrated trailing edges are similar in nature to those disclosed by Applicants and inherently possess the same efficiency-increasing properties. However, Dassen does not disclose that the angle of the serrations/panels changes passively in response to the speed and angle of the airflow at the trailing edge due to the flexing of the serrations and/or serrated panels, with the serrations and/or the panels having a given stiffness allowing for the flexing.

Crook (figure 2) shows an airfoil 101 having a trailing edge with flexible fingered regions 109, for the purpose of providing yielding resistance to airflow at the trailing edge, thereby reducing stall and instability.

Art Unit: 3745

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the wind turbine of Dassen such that the serrations and/or panels are flexible, such that they change passively in response to the speed and angle of the airflow at the trailing edges due to the flexing of the serrations and/or serrated panels, as taught by Crook, for the purpose of reducing stall and instability. Crook is from the analogous art of airplane wings, and one of ordinary skill in the art would have recognized the applicability of the flexible trailing edges of Crook to a wind turbine rotor, because wing sections and blades are of the same cross sectional shapes and deal with the same aerodynamic problems and are thus considered to be analogous to one another.

Claims 16 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dassen and Crook as applied to claims 14 and 17 above, and further in view of Vijgen. The modified wind turbine rotor of Dassen shows all of the claimed subject matter except for the sawteeth having approximately 60 degrees included angles between adjacent vertices.

Vijgen (figures 2, 3, and 13, for example) shows an airfoil 20 having a trailing edge-24 with a serrated panel 30 having plural spanwise periodic indentations in the form of sawteeth, having an included angle of 60 degrees, for the purpose of improving lift and drag.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified wind turbine of Dassen such that the sawteeth have approximately 60 degrees included angles between adjacent vertices, as taught by Vijgen, for the

Art Unit: 3745

purpose of improving lift and drag. In column 3, lines 32-37, Vijgen teaches that the principles of the invention may be applied to any aerodynamic lifting surface with sharp or moderately blunt trailing edges such as propeller blades or fan blades. Therefore, because the wind turbine of Dassen includes an aerodynamic lifting surface with sharp trailing edges, it would have been obvious to one of ordinary skill in the art to apply the teachings of Vijgen to the wind turbine blades of Dassen.

Claims 14-15 and 17-18 are also rejected under 35 U.S.C. 103(a) as being unpatentable over German Patent 311,416 in view of Dassen. The German Patent 311,416 (figures 1, 3-4, and 6-7) discloses a method and apparatus for improving the efficiency of a wind turbine u whereby the rotor blades a, a' are furnished with serrated trailing edges b, b' with plural span-wise, periodic indentations, with the serrations extending from the trailing edge into the airflow behind the trailing edge. The serrations are provided over a spanwise extent of the trailing edge having a length of about 100 percent of the radius of the blade. As shown in figures 1 and 3, the serrations a'c' are provided at an angle different from 0 degrees relative to a chord of the blade. A serrated panel b, b' may be fixed to the rear edge of the blade, which inherently includes a means for connecting the serrated panel to the trailing edges of the blades. One of ordinary skill in the art would readily recognize that the serrated trailing edges disclosed by the German Patent improve the lift and drag, which inherently improves the efficiency of the wind turbine. The German Patent 311,416 also inherently increases efficiency because the serrated trailing edges are similar in nature to those disclosed by Applicants and inherently possess the same efficiency-increasing properties. As shown in figure 1, the angle of the serrated part/panel changes

Art Unit: 3745

passively in response to the speed and angle of the airflow at the trailing edge due to the flexing of the serrations or serrated panel, shown flexibly moving from position ac to position a'c'.

However, the German Patent does not disclose that the serrations are provided as a retrofitted panel of an existing wind turbine, and does not disclose means for connecting the serrated panel to a trailing edge on each blade of the wind turbine rotor.

Dassen (figure 2 and column 2, lines 2-3) shows a wind turbine having rotor blades 3-5 that are furnished with serrated trailing edges 6-11, 22-24 with plural span-wise, periodic indentations, with the serrations being provided as a retrofit of an existing wind turbine rotor by attachment of a serrated panel 7 (figure 2), for the purpose of reducing noise and inherently increasing efficiency by providing a readily attachable serrated panel at the trailing edges of the blades. In claim 17, lines 4-5, "means for connecting the serrated panel to a trailing edge on each blade of the wind turbine rotor" invokes 35 USC 112, sixth paragraph. Applicant has not provided any explicit definition in the specification of the "means for connecting the serrated panel to the trailing edge of the blades", and the means disclosed by Dassen for connecting the serrated panel 7 to the trailing edges of the blades meets the claimed function.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the wind turbine of the German Patent 311,416 such that the serrations are provided as a retrofitted panel of an existing wind turbine, and with means for connecting the serrated panel to a trailing edge on each blade of the wind turbine rotor, as taught

Art Unit: 3745

by Dassen, for the purpose of reducing noise and inherently increasing efficiency by providing a readily attachable serrated panel at the trailing edges of the blades.

Claims 16 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over German Patent 311,416 and Dassen as applied to claims 14 and 17 above, and further in view of Vijgen. The modified wind turbine rotor of German Patent 311,416 shows all of the claimed subject matter except for the sawteeth having approximately 60 degrees included angles between adjacent vertices.

Vijgen (figures 2, 3, and 13, for example) shows an airfoil 20 having a trailing edge 24 with a serrated panel 30 having plural spanwise periodic indentations in the form of sawteeth, having an included angle of 60 degrees, for the purpose of improving lift and drag.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified wind turbine of German Patent 311,416 such that the sawteeth have approximately 60 degrees included angles between adjacent vertices, as taught by Vijgen, for the purpose of improving lift and drag. In column 3, lines 32-37, Vijgen teaches that the principles of the invention may be applied to any aerodynamic lifting surface with sharp or moderately blunt trailing edges such as propeller blades or fan blades. Therefore, because the wind turbine of Dassen includes an aerodynamic lifting surface with sharp trailing edges, it would have been obvious to one of ordinary skill in the art to apply the teachings of Vijgen to the wind turbine blades of Dassen.

Art Unit: 3745

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

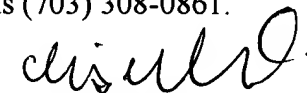
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (703)-308-2638. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (703) 308-1044. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9302 for regular communications and (703) 872-9303 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0861.

C.V.
June 2, 2003


Christopher Verdier
Primary Examiner
Art Unit 3745